Technical Memorandum
Comments on the Draft Baseline Ecological Risk Assessment Problem Formulation
Gulfco Marine Maintenance Superfund Site
Freeport, Texas
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Prepared for

U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

Prepared by

EA Engineering, Science, and Technology, Inc.
405 S. Highway 121
Building C, Suite 100
Lewisville, Texas 75067
(972) 315-3922

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1.0 INTRODUCTION

This Technical Memorandum summarizes EA Engineering, Science, and Technology, Inc.'s technical review comments for the Draft Baseline Ecological Risk Assessment (BERA) Problem Formulation prepared by Pastor, Behling & Wheeler, LLC (PBW) for the Gulfco Marine Maintenance Superfund Site (site), located in Freeport, Texas, and submitted to the U.S. Environmental Protection Agency (EPA) on 10 March 2010. The technical review was conducted to assure that the Draft BERA Problem Formulation complies with guidance, to determine if calculations have been performed correctly, and whether appropriate conclusions were reached.

General technical review comments pertaining to the Draft BERA Problem Formulation are provided in Section 2.0. Specific technical review comments associated with the body of the Draft BERA Problem Formulation, including the tables and figures, are provided in Section 3.0. Section 4.0 provides a summary based on the outcome of the technical review.

2.0 GENERAL TECHNICAL REVIEW COMMENTS

General Comment 1.

The document is difficult to follow. Consider reorganizing the document format based on Areas/Receptors. For example address soil invertebrate toxicity in South Area Soil

separately from other areas. All appropriate issues could be addressed independently using this approach (e.g. background, refined exposure scenarios, site-specific aspects that affect decisions), and the areas addressed one by one following the order presented in Table 29 from the SLERA.

General Comment 2.

The Screening Level Ecological Risk Assessment (SLERA) has been finalized, and the Problem Formulation phase should focus on those receptor/matrix/COPEC combinations for which potential risk was identified in the SLERA and shown in Appendix A. For example in Section 2.1 and Appendices C through J the risks to all food-web receptors has been discussed, and risks for all receptors have been recalculated using less conservative assumptions consistent with a SLERA refinement. However, the only food web receptor that was found to be at potential risk was the sandpiper exposed to lead in pond sediment and surface water. The refinement should focus on this receptor/matrix/COPC combination. Exposure justifications (such as the assigned area use factor) and food-web calculations should be provided for this limited combination.

General Comment 3.

The background comparison (Section 2.2) appears to have failed to assess the data distributions for assigning appropriate statistical techniques for comparison. A 2-tailed T-test has been performed for all background comparisons, which only apply to normally distributed data sets. In addition, should the T-test be appropriate, a 1-tailed approach would add power to the test. It is possible that the results of this background comparison inappropriately conclude that site concentrations are equal to background concentrations, particularly if the data are not normally distributed. EPA background guidance requires such a distribution test, and it is suggested that the latest version of ProUCL (4.1) be used for this comparison in lieu of T-test applications from the web. Until appropriate statistical background comparisons are demonstrated, the statement "The conclusion is that Site concentration of these metals are not different from the background concentrations for all metals evaluated." (Paragraph 3) is not justified.

3.0 SPECIFIC TECHNICAL REVIEW COMMENTS

The following technical review comments (Specific Comments 1 through 8) are associated with the body of the Draft BERA Problem Formulation, including the tables and figures.

1. **Section 2.1, bullets in Paragraph 1**

   All of these modifications apply only to the food-web risks. This should be clearly stated. What modifications apply for soil and sediment invertebrates? None are identified, and the assessed risk to invertebrates is exactly the same as that found in the SLERA.

2. Section 2.1, (See General Comment 1)

Focus this discussion to the single receptor/matrix/COPEC combination identified as at potential risk (sandpiper/sediment and surface water/lead). Provide details why it is defensible to assume an average exposure point concentration (EPC) and other exposure assumptions for this receptor in the re-assessment. Because only one combination needs to be performed, include all exposure assumptions, dose calculations and comparison to TRVs in the text or in a text table. It appears that the only factors that changed for the sandpiper were the body-weight and concentration in sediment, surface water, and food. Confirm that this is correct, and if so, clearly state this in the text.

3. Section 2.2: (See General Comment 2)

No justification has been provided as to why a 2-tailed T-test is appropriate. Consider performing an analysis to determine the data distribution (i.e. normal, lognormal, or random) and the most appropriate statistical test. Consider using the Wilcoxon Rank Sum test for non-normal data, and using ProUCL Version 4.1 background software. Provide a clear null hypothesis in the text for your background tests.

4. Appendix B: (See General Comment 1 and Specific Comment 3)

Statistics could be combined into a single table, rather than multiple tables for each COPEC.

5. Section 3.0, Second Paragraph

The statement is made "Midpoint values were computed from these ERM values and the ERL values used in the SLERA and are listed in Table 3 for later use in the BERA." While this is not an incorrect procedure, it is also recommend mentioning Long and MacDonald's 1998 article for interpretation of effects range low (ERL) and effects range medium (ERM) data.

6. Section 3.0, Third Paragraph

It appears that the only apparent effects threshold (AET) used was for hexachlorobenzene, with the remaining being ERLs/ERMs. Please state the chemicals for which AET values were utilized.

7. Section 4.1.3, page 16, second line from top

Frank et al. (1986) is missing from the references.

8. Section 4.1.3, page 16, second paragraph

Sude et al. (1994) should be Suedel et al. (1994).

4.0 SUMMARY

In summary:

1. Reevaluate the background screen using appropriate statistical tests.

2. Revise text and appendices to reflect only the remaining food-web receptor of concern (sandpiper/pond sediment and surface water/lead).

3. Consider reformatting into location-specific organization

Application of these changes will result in a simplified, less confusing presentation without extraneous appendix tables. In addition it is likely that reassessment of the background screen will result in the addition of some additional metals as COPEC that will need to be addressed in the BERA.

REFERENCES

Long, E.R. and D.D. MacDonald. 1998. Perspective: Uses of Empirically Derived, Sediment Quality Guidelines for Marine and Estuarine Ecosystems. Human and Ecological Risk Assessment. 4:1019-1039.